

Sub F17 1. (Amended) A method of receiving a wireless transmission comprising the steps

of:

inverting the polarity of an incoming waveform on every one half clock cycle of a conversion clock having a predetermined frequency to produce a commutated waveform, thereby translating said incoming waveform downward in frequency; and

converting said commutated waveform to a series of representative digital values using a delta-sigma modulator clocked by said conversion clock operating at said predetermined frequency.

2. The method of claim 1, wherein said incoming waveform is centered about a radio frequency and carries a modulated signal, wherein said conversion clock has a frequency approximately equal to said radio frequency, and said series of representative digital values are representative of said modulated signal.

3. The method of claim 2, further comprising the step of digitally filtering said series of representative digital values according to programmable filter characteristics wherein said programmable filter characteristics are selected based upon a type of modulation of said modulated signal.

Sub G17 4. (Amended) The method of claim 1, wherein said step of inverting comprises the steps of:

producing an inverted signal representation of said incoming waveform;

producing a non-inverted signal representation of said incoming waveform;

coupling said inverted signal representation to a first input port of a switch;

coupling said non-inverted signal representation to a second input port of said switch; and

coupling said conversion clock to a control port of said switch.

5. The method of claim 1, wherein said incoming waveform is received over an antenna and wherein an amplitude of said incoming waveform is in fixed proportion to an amplitude of a signal strength received by said antenna.

6. The method of claim 1, further comprising the step of filtering an antenna signal to prevent aliasing out-of-band signal and noise power into a desired signal band, said step of filtering producing said incoming waveform, and wherein a frequency of said conversion clock is selected from a range of frequencies passed in said step of filtering.

Sub F97 7. (Amended) A circuit employed in a receiver comprising:

a continuous time commutator configured to be coupled to a digital conversion clock and configured to invert the polarity of an incoming signal applied to an input port on every half clock cycle of said digital conversion clock having a predetermined frequency and to produce a commutated signal at an output port, thereby translating said incoming signal downward in frequency; and

a3 a delta-sigma modulator having a clock input port coupled to said digital conversion clock operating at said predetermined frequency, having a signal input port coupled to said output port of said continuous time commutator and having an output port configured to produce a series of digital values representative of a modulation waveform carried by said incoming signal.

Suys. (Amended) The circuit employed in a receiver of Claim 7, wherein said continuous time commutator comprises:

a complementary amplifier configured to receive said incoming signal and to produce an inverted version of said incoming signal at an inverted output port and to produce a non-inverted version of said incoming signal at a non-inverted output port; and

a switch having a first input port coupled to said inverted output port, having a second input port coupled to said non-inverted output port and having a control port coupled to said digital conversion clock.

9. (Amended) The circuit employed in a receiver of Claim 7, wherein said delta-sigma modulator comprises:

a loop amplifier having a first input port coupled to said output port of said continuous time modulator, having a second input, and having an output port;

a continuous time loop filter coupled to said output port of said loop amplifier and having an output port;

an edge-triggered comparator coupled to said output port of continuous time loop filter, having a clock input coupled to said digital conversion clock and having an output port; and

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a one-bit digital to analog converter having an input port coupled to said output port of said edge-triggered comparator and having an output port coupled to said second input of said loop amplifier.

10. (Amended) The circuit employed in a receiver of claim 7, further comprising a programmable digital filter having an input port coupled to said output of said delta-sigma modulator, said programmable digital filter configured to filter said series of digital values according to filter characteristics selected based upon a type of modulation of said modulation waveform.

11. (Amended) The circuit employed in a receiver of claim 7, further comprising an antenna coupled to said continuous time commutator so as to receive said incoming signal, wherein an amplitude of said incoming signal is in fixed proportion to an amplitude of a signal strength received by said antenna.

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12. (Amended) The circuit employed in a receiver of claim 7, further comprising a filter configured to receive an antenna signal and configured to prevent aliasing of out-of-band signal and noise power into a desired signal band, said filter coupled to said input port of said continuous time commutator, wherein a frequency of said conversion clock is selected from a range of frequencies passed by said filter.

13. (Amended) A circuit comprising:

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a linearizing operational amplifier in a non-inverting unity follower configuration, configured to receive an incoming waveform;

a transistor network having a first input coupled to an output of said linearizing operational amplifier and having a second input coupled to said incoming waveform, said linearizing operational amplifier and said transistor network configured to produce a pair of complementary currents that are linearly related to an input voltage level of said incoming waveform;

a first current source coupled to said transistor network and configured to provide a fixed current through said transistor network;

a commutator network coupled to a clock signal and coupled to said pair of complementary currents that are linearly related to said input voltage level of said incoming waveform such that the incoming waveform is translated downward in frequency;

a second current source configured to produce a fixed current; and

a switching network coupled to said second current source, having complementary input ports configured to be coupled to logic values and configured to produce complementary switched currents, wherein said complementary switched currents are coupled to said

commutator network in order to control together complementary voltage outputs produced by the circuit.

a 3 Sub F3 14. (Amended) An apparatus for receiving a wireless transmission comprising:

means for inverting the polarity of an incoming waveform on every one half clock cycle of a conversion clock having a predetermined frequency to produce a commutated waveform, thereby translating said incoming waveform downward in frequency; and

means for converting said commutated waveform to a series of representative digital values using a delta-sigma modulator clocked by said conversion clock operating at said predetermined frequency.

15. The apparatus of claim 14, wherein said incoming waveform is centered about a radio frequency and carries a modulated signal, wherein said conversion clock has a frequency approximately equal to said radio frequency, and said series of representative digital values are representative of said modulated signal.

16. The apparatus of claim 15 further comprising means for digitally filtering said series of representative digital values according to programmable filter characteristics wherein said programmable filter characteristics are selected based upon a type of modulation of said modulated signal.

Subj 7. Amended 17. (Amended) The apparatus of claim 14, wherein said means for inverting performs the steps of:

means for producing an inverted signal representation of said incoming waveform;

means for producing a non-inverted signal representation of said incoming waveform;

means for coupling said inverted signal representation to a first input port of a switch;

means for coupling said non-inverted signal representation to a second input port of said switch; and

means for coupling said conversion clock to a control port of said switch.

18. The apparatus of claim 14, wherein said incoming waveform is received over an antenna and wherein an amplitude of said incoming waveform is in fixed proportion to an amplitude of a signal strength received by said antenna.

19. The apparatus of claim 14, further comprising means for filtering an antenna signal to prevent aliasing out-of-band signal and noise power into a desired signal band, said means for filtering producing said incoming waveform, and wherein a frequency of said conversion clock is selected from a range of frequencies passed in said means for filtering.

REMARKS

The Applicant thanks the Examiner for the constructive interview which was courteously granted on May 30, 2001. The rejections under 35 USC 102 and 35 USC 103 were discussed during the interview. The Examiner agreed to the differences (stated below) between the cited prior art and the present invention, and agreed to certain amendments in the claims, of the present invention, to make them allowable.

Incidentally, in the foregoing claims, a clean copy of all claims has been presented; and in an appendix to this amendment the specific changes to amended claims are shown by brackets and underlining.

In the Office Action, claims 4, 14, and 17 were objected based on various informalities. To overcome these objections, please delete the word "further" in claims 4 and 17, line 1; please replace "an non-inverted signal" with --a non-inverted signal-- in claims 4 and 17, line 4; and, please replace "A apparatus" with --An apparatus-- in claim 14, line 1.

In the Office Action, the language of the abstract was objected. The Applicant has amended the abstract, and has attached it to this amendment.